PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of	Docket No: Q91047
Yoshinori IGUCHI, et al.	
Appln. No.: 10/802,837	Group Art Unit: 1791
Confirmation No.: 4257	Examiner: Jason L. LAZORCIK

Filed: March 18, 2004

For: METHOD OF MANUFACTURING GLASS ARTICLES, METHOD OF MANUFACTURING GLASS GOBS, AND METHOD OF MANUFACTURING OPTICAL ELEMENTS

REPLY BRIEF PURSUANT TO 37 C.F.R. § 41.41

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.41, Appellant respectfully submits this Reply Brief in response to the Examiner's Answer dated June 9, 2009. Entry of this Reply Brief is respectfully requested.

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STATUS OF CLAIMS

Claims 1-15 and 17-26 are all the claims pending in the present application. Claims 1-15 and 17-26 have been finally rejected, and are the subject of this appeal. Claim 16 was cancelled.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. **Claims 1-7, 11-15 and 17-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howard (US 1,853,002) in view of Ikeuchi (US 5,738,701) and Yoshikuni (US 2003/0000252 Al).**

B. **Claims 8, 9, 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Howard (US 1,853,002) Ikeuchi (US 5,738,701), and Yoshikuni (US 2003/0000252 Al) as applied above and further in view of Murakami (US 2003/0131628 A1).**

Appellants note with gratitude the Examiner's withdrawal of rejections under 35 U.S.C. § 112, first and second paragraphs, at page 2 of the Examiner's Answer.

ARGUMENT

A. Rebuttal of Examiner's Reply to Appellants' Argument Concerning Rejection of Claims 1-7, 11-15 and 17-26 under 35 U.S.C. 103(a) as being unpatentable over Howard (US 1,853,002) in view of Ikeuchi (US 5,738,701) and Yoshikuni (US 2003/0000252 Al).

1. Preliminary Comments

Appellants respectfully submit the following preliminary comments, prior to addressing the Examiner's Response to Argument beginning at page 13 of the Examiner's Answer, in order to place a practical perspective on the claimed subject matter and to address issues raised in the Examiner's statement of the Grounds of Rejection at pages 3-13 of the Examiner's Answer.

A. Grouping of Claims

As a preliminary matter, Appellants note that all of the claims on appeal are method claims and that these method claims include four sets of independent claims which, for convenience, may be identified according to their resulting product.

Claims 1, 2 and 3 are directed to a method of manufacturing glass preforms for press molding.

Claims 5, 6 and 7 are directed to a method of manufacturing glass preforms for press molding optical elements.

Claims 14, 20, 22, 23, 24, 25 and 26 are directed to method of manufacturing optical elements.

Claim 15 is directed to a method of manufacturing glass gobs.

B. The Manufacture of Optical Elements According to the Invention Is Not In the Prior Art

The Examiner states at pages 4 and 5 of the Examiner's Answer the understanding that "the invention is directed towards the fabrication of the preform and not *per se* to the subsequent

reshaping or press molding of the preform to final form which Applicant appears to acknowledge as admitted prior art." This understanding is not correct.

Claims 14, 20, 22, 23, 24, 25 and 26 are directed to method of manufacturing optical elements, which includes three major steps in a prescribed sequence that are integrated into a single process. Appellants have made clear in their disclosure that the integration of the steps, as detailed in the claims, of (1) manufacturing glass preforms, followed by (2) heating a glass preform and then (3) press molding the preform into an optical element, is a feature of their invention.

First, Appellants have made no concession that the heating and press molding steps are prior art. They are part of the multi-step invention defined as a whole by claims 14, 20, 22, 23, 24, 25 and 26.

Second, Appellants have described the invention as a combination of three steps in a continuous process. For example, and without limitation, Fig. 1 illustrates the integrated structure that provides the combination of forming a glass gob 6 according to a process as illustrated in Fig. 2 and then forming the optical element 7. As described at pages 16-22, the process involves an integrated series of steps that together comprise the invention.

Third, Appellants respectfully submit that the repetitive manufacturing of high quality optical elements (no defects), with high consistency (shape and weight) at high production rates and at high yield is the result of the combination of all of the recited steps, and it is that combination that must be evaluated against the prior art.

The fact that heating and pressing steps are used in the art during the production of some glass products does not permit the Examiner to isolate and ignore the importance of those steps to the overall process as recited in the claims.

C. The Examiner's Answer Omits Critical Gob-Forming Factors in Describing Ikeuchi

At pages 5-7 of the Examiner's Answer, the Examiner omits critical gob-forming factors in the description of the process in Ikeuchi. The Examiner states at page 5 that Ikeuchi "teaches nearly every element of the glass gob formation as set forth in applicants claimed invention (see Figure 4 excerpt below)." This statement and the subsequent supporting discussion at page 5 is

not correct, as Ikeuchi teaches a structure and process that is wholly inconsistent with implementing critical features of the claimed invention that are central to the achievement of glass products having high quality and high yield.

Specifically, the Examiner fails to acknowledge that Ikeuchi discloses only the use of a "support member 10" that is (1) positioned and moved to capture a portion of a glass melt, (2) is concave to provide stability and (3) must include reference surface 10a and bottom surface 10b that are provided with a contour that defines the external surface and shape of a resulting gob, as described at col. 4, lines 6-41 and col. 7, lines 25-38. The contour is required to provide a predetermined reference shape the bottom of the gob and a predetermined thickness to the gob. The requisite shape of the surface is limited so that easy and simple placement of the glass gob, having a desired contour, into a press tool is possible, as disclosed at col. 4, lines 42-51.

In particular, these required structures in Ikeuchi are inconsistent with the stated limitations of claims 8-10, which require a flat surface (claim 8), a tilted surface (claim 9) or the receipt of glass flow on two different surfaces (claim 10). Moreover, because of the required contoured surface in Ikeuchi, the features of Murakami would be incompatible with Ikeuchi.

D. The Examiner's Answer Misconstrues the Claimed Transfer Step

At pages 7 and 10 of the Examiner's Answer, the Examiner asserts with regard to claims 1, 2, 3, 5 and 15 that the statement in Ikeuchi that a glass gob formed in the support member "after cooling solidification may be press molded in a mold (column 5, lines 48-51)…strongly implies a transferring step from said support member to said mold (e.g., glass forming member')."

Even if some "transfer" of a cooled and solidified gob is suggested by the cited text, it does not meet the claim requirement that the moving, transferring and forming steps are part of a continuous production process, where the glass melt "flow continuously out of a nozzle" and each glass gob formed in the moving step is necessarily transferred as a "separated glass gob" that is later cooled in the forming step. The Examiner's comment ignores the express language of the claim that firstly requires the glass melt to be received by a support member, which is moved to have the melt separated to form a gob, and that secondly requires an immediate

transferring of the glass gob to a glass perform forming member that is stopped. Since the language of the claims expressly requires (1) a "continuous" separation of glass gobs from a glass melt and (2) a stopping for transfer that is shorter than a gob preparation period, the transfer is necessarily of a heated gob that is softened and is beginning to cool. It is not of a cooled and solidified gob, as taught by the quoted text in Ikeuchi.

Ikeuchi's process is not described as continuous with respect to the production of shaped preforms from a continuous flow of glass melt. Further and the quoted language is inconsistent with a process that is based on a continuous flow of glass melt, as it suggests that the glass gob in the support member 10 is held for cooling and/or deposited for storage prior to press molding. Rather than suggesting an immediate transfer of a heated gob to a press forming mold, the passage suggests storing the glass gob until required for use.

E. *The Examiner's Answer Does Not Address the Requirement for the Glass Melt to be "Temporarily Broken"*

At page 9 of the Examiner's Answer, the Examiner notes that Appellants have asserted the temporary breaking of contact by the glass melt with the support during the movement of the support is not taught in Ikeuchi. This feature clearly is different from the teachings in Ikeuchi and the remaining prior art where the support 10 is in continuous contact with the melt, once deposit of the melt begins. Moreover, the curved sides of the support 10 would preclude any temporary breaking of contact with the surface of the support as it is moved downward. Finally, the teaching in Ikeuchi clearly is that the glass melt continues to flow into the curved surface of the support and, in fact, the support is moved downwards intermittently so that the nozzle does not touch the melt but remains at a relatively constant distance from the surface of the melt in the cavity formed by surfaces 10a, 10b.

F. *The Examiner's Answer Improperly Assumes a Structural Limitation Exists in the Prior Art without Citation of Any Art*

Applicants expressly require a support member cooled by circulation of coolant through the support member. The Examiner's Answer at pages 9 and 10 characterizes that as "a merely trivial extension over the teachings set forth in Ikeuchi." No evidence is presented for this

assertion. The Examiner refers to Fig. 3 of Yoshikuni, but that illustrates a glass gob molding structure and not a support for receiving a glass melt. Moreover, the parallel structures are for blowing gas to float a glass gob and not to cool the mold.

G. *The Examiner's Answer Discussion of Howard Concerns Ancient Glass Making Technology Inapplicable to Production of Glass Gobs*

The Examiner's Answer mentions Howard at pages 9 and 10 where a glass stream that "continuously flows" will fill a transfer cup having multiple stacked parts 14, 15, 16 to form an ingot. The Examiner asserts that this process serves an "equivalent purpose to the 'support member' disclosed in the Ikeuchi process, namely to provide a glass gob free from defects and distortions associated with direct feeding of the molten stream into a forming member." This assertion ignores the significant limitations on the Howard process.

First, from the description of the process, Howard clearly is not applicable to making gobs, but rather an ingot made of built up glass flow into a large cup, where the glass solidifies at a non-uniform rate. Specifically, the tip portion in mold 14 will solidify while the melt continues to pour into the top mold 16 and is in a sufficient liquid form to be cut by shears 13. One skilled in the art of gob and optical element production would know that such built up glass product would have significant defects, including striae, stresses and bubbles, making the structure wholly useless for an optical application.

Second, the product is a large solidified ingot, rather than a glass gob. Howard produces large glass objects in a parasol mold 18. The structure of Howard, including transfer cup and mold, is incapable of handling small gobs.

Third, the process is not disclosed as being continuous, as applied to gob production. Given the steps required after filling the transfer cup, including opening the cup or rotating it to drop the ingot into the mold as illustrated in Figs. 6 and 7, glass that continues to flow would be lost. If flowing glass is accumulated until a new mold is moved into place or the filled mold is dumped, and then the accumulation dropped into the transfer cup, further deterioration of the glass would result. Clearly, the teaching is not applicable to a continuous process for producing high quality glass gobs.

H. *Timing in the Invention is Critical and Not a Matter of Mere* Optimization

At pages 12 and 13 of the Examiner's Answer, the Examiner admits that the prior art does not provide an explicit limitation upon the relative timing of the transfer process with respect to the duration of the gob formation process. In the absence of such critical teaching, the Examiner asserts that optimization would be a matter of common engineering practice. Alternatively, the Examiner asserts that Yoshikuni discloses a concern for the effect of acceleration on glass, causing deformation. The Examiner then asserts that a balance must be established between high throughput and low production speed to minimize gob distortion that would lead to the timing claimed in the invention based on the process in Ikeuchi.

However, this assertion ignores the fact that the conventional approach taken in the industry where a continuous flow of glass melt is employed requires a glass forming mold to be filled with glass melt and then moved rapidly so that a next mold can be filled in succession.

The present invention, by using the intermediary of a support for receiving a glass melt and then transferring the formed glass gob to a stopped preform mold, can achieve high throughput. Further, by adjusting the timing of the stoppage of the glass preform forming member to be less than a gob preparation period (as stated in claims 1-3, 14, 22 and 23) specifically, less than or equal to 70% of a fixed cycle period for forming a gob into a preform (as stated in claims 5-7 and 24-26) adequate time for transfer of the gob from the support to the mold is assured, while adequate time to move the gob in the mold without incurring distortion is ensured.

2. Appellant's Reply to the Examiner's Response to Arguments

At pages 16-22, the Examiner presents a reply to several arguments made by Appellants. Appellants rebuttal follows.

(I) Applicant has no basis to conclude that Ikeuchi teaches use of the same member for supporting and preform formation or that an arrangement employing separate supporting and forming members is precluded from the Ikeuchi process

Appellants concede that a separate molding of the glass gob is possible in Ikeuchi. However, as asserted in item D above, the transfer step from a support 10 to a mold during a continuous melt flow process is not taught in Ikeuchi.

(II) Applicants arguments are directed to Ikeuchi individually where the rejection is based upon the combined teachings to Ikeuchi, Howard, and Yoshikuni

Applicants disagree. Applicants' arguments are directed to the structures and operational steps of Ikeuchi and Howard, which concern significantly different processes for significantly different glass products, that make the references incompatible to one of ordinary skill in the art. It has long been recognized that the teachings of one reference that makes that reference incompatible with another reference, or directs one skilled in the art away from the other reference, are relevant to the issue of obviousness. Thus, the arguments against a combination of Ikeuchi with Howard, based upon structures of Ikeuchi that make it incompatible with Howard, are a relevant basis for attack.

(III) Applicant has failed to present any reasoned basis to concluded that Ikeuchi is precluded from a combination with Howard in the manner stated

In the foregoing discussion of Ikeuchi and Howard, Appellants have demonstrated that the two references are directed to the manufacture of different products (glass gobs vs glass product ingots), having different quality requirements (fine optical glass products vs large glass objects) using different processes (Because of these differences, one skilled in the art would not think to consult Howard for a modification of Ikeuchi, particularly to add a separate shallow concave support to add critical dimensions and shapes

(IV) Applicants argument purporting a distinction between a glass preform and a glass gob constitutes a distinction without a substantive difference

The Examiner asserts that there is no difference between a glass gob and a glass preform, as "the glass body prepared by the Ikeuchi support and the glass body prepared by the Howard support appear on their face to constitute analogous preliminarily shaped masses of molten glass which shaped masses are respectively intended for subsequent shaping to a final product form,"

and that "no clear distinction has been made of record and indeed it is not evident that such a distinction even exists."

One skilled in the art reading Ikeuchi would obtain the clear understanding that a glass gob must have high quality, be free of stresses and defects, and must be processed in a state that minimizes such defects. The process related to production of glass gobs in Ikeuchi is expressly designed to produce optical products using optical quality glass. One skilled in the art reading Howard would clearly understand that the glass technology of seventy years earlier did not have such capability. Moreover, the product in Howard does not have high quality optical properties nor is it concerned with optics, as the multi-segment mold that is filled with glass melt at different times from different processes clearly has no relevance to the production of high quality glass objects.

These differences clearly provide a "necessary and substantive distinction between the recited glass 'preform' and the recited glass 'gob', notwithstanding a "broadest reasonable construction of the claim language," as applied by the Examiner.

(V) Applicants categorical statement that the stopped period "does not affect the production rate" is without merit on its face

The Examiner states that "To the Extent that Applicant alleges that the stopped period for transfer influences only distortion of the glass gob but not the production rate, Applicant is advised that this position appears to be flawed on its face." Applicant disagrees.

The claims require a fixed cycle period or a gob preparation period, both of which defined a fixed rate of production. The period during which the glass perform forming member is stopped for transfer of the glass gob from the support member is variable, within the fixed rate. That period of stopping will determine how fast a forming member must move in order to complete its function during the fixed cycle period or gob preparation period. That is, the production rate is not changed.

(VI) The existence of other process variables which may also affect production rate is not proof that the stopped rate "does not affect production rate" nor does it prove that the stopped period is excluded from process optimization.

The Examiner states that "to the extent that Applicant alleges that other factors or process variables may influence the rate of production, Applicant is advised that such an observation does not detract from the fact that one of ordinary skill would likewise view the stopped period as subject to process optimization in the manner set forth by the Examiner. More significantly, the fact that Applicant substantially reiterates the same relationship between gob transfer period and gob distortion forces as set forth in the prior art reference to Yoshikuni demonstrates that Applicants preferred process timing was reasonably derived in accordance with the known and previously documented result effective relationship set forth by at least Yoshikuni.

Applicants submit, however, that neither Yoshikuni nor the other applied art teaches or suggests a constant gob preparation period or a fixed cycle period during which a period for stopping a glass perform forming member is less than gob preparation period or a fixed cycle period, as claimed.

(VII) Applicants arguments [concerning temporary breaking of contact between the lower end of the glass melt and the support] are directed to features which are not claimed

The Examiner asserts with regard to the process in claim 15 that "the process as set forth in the Ikeuchi reference appropriately reads upon the gob forming method as recited in the instant claim language. Specifically, Applicant was advised that in the march 18, 2008 Official Action that from the time the gob is severed from the melt (fig 4g) through the reengagement of the support member to said melt (fig 4c), contact between the lower end of the glass melt and the support would be properly construed as "temporarily broken".

The claim expressly requires that, (1) prior to dripping from the nozzle, the glass melt is brought in to contact with the support member, (2) then the support member is moved downward causing a glass gob of prescribed weight to drip onto the support member, and (3) the support member is moved downward in such a manner "that contact is temporarily broken between the support member and the lower end of the glass melt."

As to the temporary breaking, the Examiner asserts that "prior to the dripping of the glass gob onto the support member as depicted in figure 4f, the support member is moved downward (see figure 4a) in such a manner that contact is temporarily broken between the support member

(10) and the lower end of the glass melt (6b). Appellants respectfully submit that the Examiner's hypothesis is only conjecture without any scientific support. In fact, the clear import of the teaching of the process with regard to Figs. 4(a)-4(f) is that once the glass encounters the curved surface of support member 10, contact is maintained because the support is moved downward at a rate so that the melt does not overflow the cavity formed by surfaces 10a and 10b. Contrary to the Examiner's speculation, the goal is to maintain contact even after the support is accelerated in a downward direction to cut the glass melt from the gob.

B. Rebuttal of Examiner's Reply to Appellants' Argument Concerning Rejection of Claims 8, 9, 10 under 35 U.S.C. § 103(a) as being unpatentable over Howard (US 1,853,002) Ikeuchi (US 5,738,701), and Yoshikuni (US 2003/0000252 Al) as applied above and further in view of Murakami (US 2003/0131628 A1).

Applicants would submit that Murakami is not prior art under 35 U.S.C. § 103, as it was not published before the US filing date of the present application and is assigned to the assignee of the present application and the present application and Murakami were commonly owned at the time the present application was filed in the USPTO.

For the above reasons as well as the reasons set forth in Appeal Brief, Appellant respectfully requests that the Board reverse the Examiner's rejections of all claims on Appeal. An early and favorable decision on the merits of this Appeal is respectfully requested.

Respectfully submitted,

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